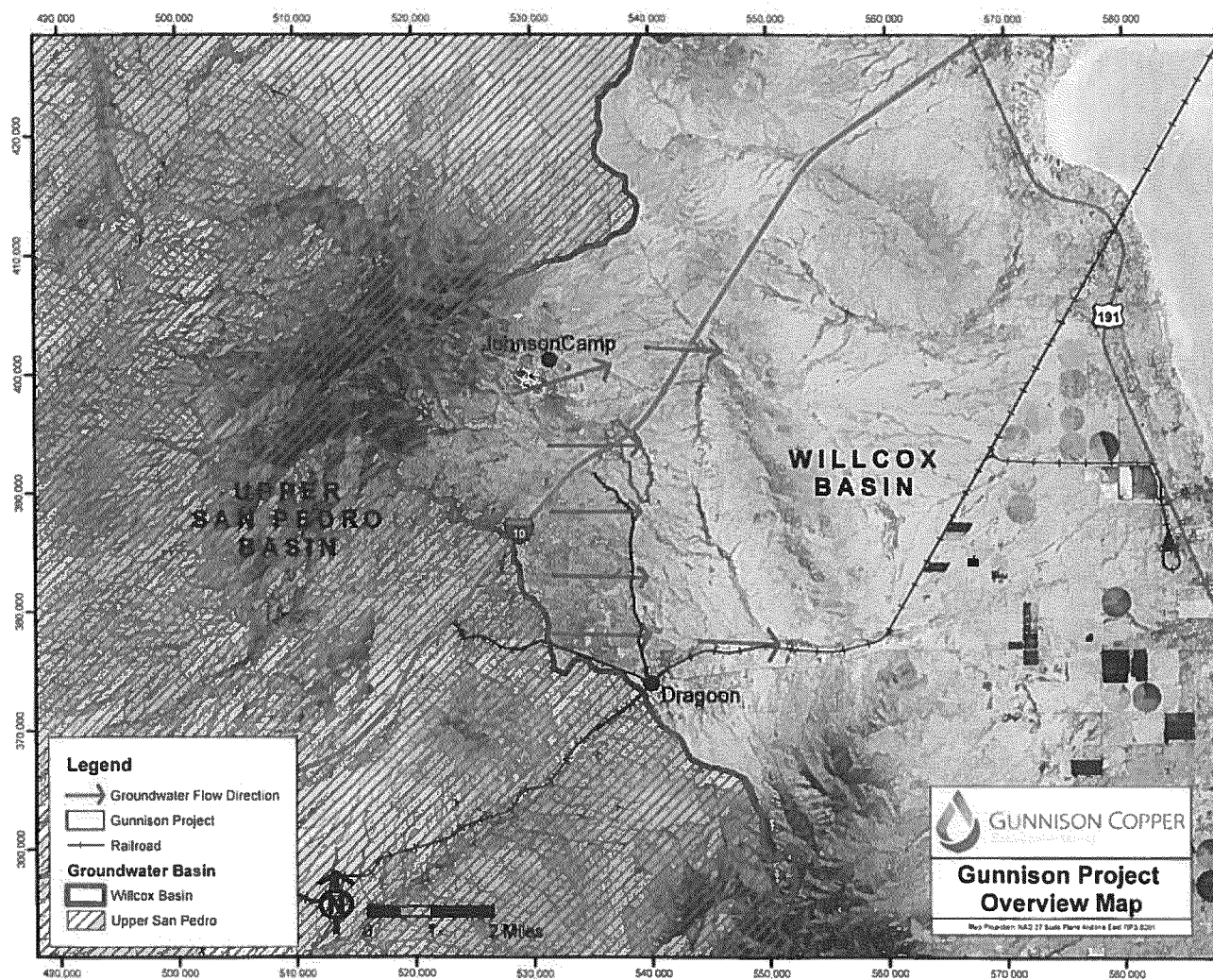


CENTERPIECE

## Scrubbing copper from bedrock

In-situ recovery process will 'mine' the metal without digging up the historic Dagoon landscape

Eric Petermann Mar 26, 2016



Courtesy graphic

Eastbound drivers on Interstate 10 capture a memorable image of the southwest as the highway climbs past 5,000 feet on the way through Texas Canyon. Huge boulders, some delicately stacked in vertical piles, decorate a landscape that serves as a reminder of the region's long history.

To the south of the highway, 17 miles northeast of Benson, is the unincorporated community of Dagoon, once a stop on the Butterfield-Overland stage route through Arizona. Nearby, the Amerind Museum was founded by Connecticut native William Shirley Fulton in 1937, and is home to artifacts that "... tell the story of America's first peoples from Alaska to South America and from the last Ice Age to the present."

Johnson Camp Mine lies north of the interstate, with its own history dating to the 1880s and, until recently, a reminder of a bygone era. After years of limited operation, the property and its copper processing facilities were recently purchased by the Excelsior Mining Company.

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The new owners paid almost \$5 million in back taxes to Cochise County and other local taxing districts as part of the acquisition costs. The Johnson Camp Mine site is adjacent to existing Excelsior land holdings located south of the interstate, and sloping toward the Willcox Playa.

Excelsior has plans to reopen the processing facility and resume a history of mining that started in the area more than 130 years ago. The area is east of the Little Dagoons, some 65 miles southeast of Tucson in the heart of Arizona's Copper Porphyry Belt, a stretch identified for its rich concentration of high-quality copper.

Unlike previous open-pit operations at the Johnson Camp Mine, however, Excelsior's "Gunnison Copper Project" will utilize an in-situ copper recovery system to scour the bedrock and capture the mineral, eventually producing 2.16 billion pounds of copper as copper cathode sheets.

Except for additional truck traffic on Interstate 10, motorists on the highway are not likely to notice the operation.

In-situ copper recovery pumps a "weak" acid into the porous bedrock, located some 600 feet below the surface. As the solution leaches the copper deposits off the rock, it is extracted

through surrounding recovery wells and transported to the processing plant, where the solution is separated from the metal.

"When we're done, the landscape will look just as it does now, undisturbed," said Excelsior CEO Dr. Stephen Twyerould. "This process consumes virtually no groundwater and we capture all of the solution."

Although in-situ recovery is less efficient in leaching all of the copper from the rock underground, the process is both less invasive and less costly compared to open-pit mining, Twyerould said. The location of the Gunnison Copper Project makes it a good candidate for the recovery process, Twyerould added, because the property is surrounded by limestone and the groundwater flow slopes toward the Willcox Playa, not Dragoon and the San Pedro River subwatershed.

"The recovery is very close to 100 percent, but even if some solution should escape, it will be neutralized by the limestone that surrounds the site," Twyerould said.

The project is also "scaleable," allowing Excelsior to develop the Gunnison Copper Project in small increments when the price for the metal is low, or expand the operation if copper prices increase.

"Our operating costs are well below a dollar per pound of copper, so compared to open-pit mining, we won't be incurring nearly as much overhead cost during the life of the project," Twyerould said.

Nearby Johnson Camp Mine got its start in the early 1880s, shortly after the Southern Pacific Railroad arrived in the area. At its peak, the town of Johnson near the site of the open pit mine had two 30-ton smelters and was the headquarters in 1883 of the Peabody Co., which employed 150 men. The camp was named after George J. Johnson, who served as the general manager of the Cochise Copper Company.

Mining activity has continued at the property in varying degrees for more than a century, largely dependent on the price of copper. Immediately prior to its acquisition by Excelsior, Johnson Camp Mine was owned by Nord Resources Corp., which was using the processing facilities for solvent extraction and electrowinning.

For the past several years, truck traffic at the property has been limited to a local rock contractor who generates landscaping material from the site.

Excelsior formally acquired Johnson Camp Mine in December, but the company began its development of the Gunnison Copper Project earlier in the year, seeking permits for the land south of I-10, about five miles north of Dagoon. Copper production is scheduled to begin in late 2018 and is expected to continue for 20 years.

The project is expected to generate as much as \$2.9 billion in the Arizona economy during its operation, creating 108 "on-site" jobs and more than 700 positions in related industries.

Twyerould, born in Australia, holds a doctorate in Philosophy in Geology and Geochemistry from the University of Oregon. With more than 29 years of experience in the mining industry, he was instrumental in the growth of Reliance Mining Limited from a \$3 million company to a \$100 million company, in four years. Reliance has since been acquired by Consolidated Resources, CSM-AU.

**Eric Petermann**

Managing Editor

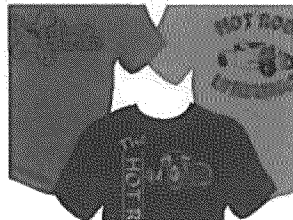
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